

## Magnet Power-On Access - DØ Collision Hall

### Revision Log

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### Approvals

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# **1 INTRODUCTION**

## **1.1 Purpose**

This procedure describes the steps to be followed when personnel have to perform work in the DØ Collision Hall while the DØ toroids and/or solenoid magnet power supplies are on. The DØ Department Project Electrical Engineer, or designee, is responsible for executing this procedure.

## **1.2 Scope And Applicability**

This procedure addresses the actions necessary to safely enter and work in the Collision Hall while the magnets are powered. It is done under supervised access conditions, with additional restrictions placed on entry, as described in this procedure. Only personnel authorized by the DØ Run Coordinator, or designee, and Project Electrical Engineer, or designee, are permitted to enter the Collision Hall during magnet power-on conditions.

# **2 PRECAUTIONS AND LIMITATIONS**

- A. Work should be carried out only after the reasons why it cannot be done de-energized are understood and agreed upon with DØ Run Coordinator, Project Electrical Engineer, and PPD Senior Safety Officer.

# **3 PREREQUISITE ACTIONS**

## **3.1 Documents**

- [1] Obtain an informational copy of this procedure to use as a checklist.
- [2] Verify that the approval date and version number of the informational copy is the same as the controlled version in the DØ Operating Manual.

## **3.2 Special equipment, tools, parts, and supplies**

None

### 3.3 Special approvals

- [1] Enter the name of the DØ Project Electrical Engineer or designee responsible for executing this procedure below:  
Name \_\_\_\_\_ I.D. # \_\_\_\_\_
- [2] Obtain PPD SSO approval on the "Beams Division Safety System Power Supply Jumper Request" form.
- [3] Submit the signed "Jumper Request" form to the Beams Division Senior Safety Officer for approval. Whenever possible, this form must be submitted at least 24 hours in advance.

### 3.4 Special training

- [1] Familiarization with toroid and solenoid operating procedures and hazards; training provided by Project Electrical Engineer.

## 4 PROCEDURE

### 4.1 Documenting those involved

**NOTE** *Each party performing work must consist of at least two people and must have at least one escort. The escort cannot be part of the party performing the work.*

- [1] Enter the names and ID numbers of those involved in the access

	Name	I.D.#
DØ Operator	_____	_____
Escort 1	_____	_____
Escort 2 (as needed)	_____	_____
Escort 3 (as needed)	_____	_____
Access Worker 1	_____	_____
Access Worker 2	_____	_____
Access Worker 3	_____	_____
Access Worker 4	_____	_____
Access Worker 5	_____	_____
Access Worker 6	_____	_____

- [2] Make a copy of the names and I.D. numbers and give this to the DØ Operator.

#### 4.1 Documenting those involved (continued)

- [3] Tell the DØ Operator that only the people on the list can sign out a Collision Hall supervised access key.
- [4] Enter the name of the Beams Division Safety Officer, or designee below.  
Name \_\_\_\_\_ I.D. # \_\_\_\_\_

#### 4.2 Preparing the collision hall

- [1] Apply a LOTO lock to the appropriate supply(s) AND request that the Beams Division Safety Officer, or designee, jumper the power supply electrical permits.
- [2] Verify with the Shift Captain or DØ Operator that all the Collision Hall supervised access keys and controlled access keys are accounted for.
- [3] Station a flashing red light and sign at each possible entrance to the Collision Hall. The sign shall read as follows:

**Caution - Magnet Testing In Progress**  
**Escort Required For Entry**  
**Contact DØ Control Room x8800**

- [4] Post each entrance with the standard magnetic field warning signs that state "Danger - Magnetic Field Hazard - No persons with cardiac pacemakers when magnet energized".
- [5] Search the Collision Hall and verify that all unauthorized personnel have left it.

#### 4.3 Testing the magnet power supply crash buttons

**NOTE**      *Perform the following steps ONLY for the magnet power supplies that must be operated for the scheduled work.*

- [1] Instruct the DØ Operator to do the following for the first supply to be tested:
  - [a] Set the magnet power supply to 0 amps from the Controls Console.
  - [b] Manually switch the power supply to local.
  - [c] Manually set the internal reference control to 0 amps.
  - [d] Turn ON the main circuit breakers (utility room) and front panel circuit breakers (on power supply) for the magnet power supply.
  - [e] Manually reset the power supply interlocks.

### 4.3 Testing the magnet power supply crash buttons (continued)

- [f] Manually reset the power supply and press the ON button.
- [2] Press and then manually retract the Solenoid/Toroid magnet power supply crash button located in the Collision Hall entrance.
- [3] Ask the DØ Operator if the associated magnet power supply tripped off. IF it did not, THEN discontinue the test until the crash button is repaired and works properly.
- [4] Repeat steps [1]-[3] for each magnet power supply to be used.
- [5] When finished, instruct the DØ Operator to do the following:
  - [a] Reset the power supply interlocks.
  - [b] Reset the power supplies.
  - [c] Place the power supplies into the remote mode.
  - [d] Proceed to energize the magnet(s) to their desired operating configuration (polarity and current).

### 4.4 Performing work in collision hall

- [1] Record current(s) and polarities for the work below (use a separate sheet for multiple configurations).
  - [a] Main Toroid \_\_\_\_\_ amps (control system readback)
  - [b] Solenoid \_\_\_\_\_ amps (control system readback)
  - [c] Main Toroid Polarity \_\_\_\_ FWD \_\_\_\_ REV (control system readback)
  - [d] Solenoid Polarity \_\_\_\_ FWD \_\_\_\_ REV (control system readback)
- [2] Instruct the escort(s) to remain in visual and audible contact with the personnel performing the work and to check in with the DØ Operator or Shift Captain at least once per hour to let them know that the work is proceeding safely. Two-way radios may be used for audible contact.
- [3] Enter the Collision Hall with the people involved in the power-on work, ensuring that each has a supervised access key.

#### 4.4 Performing work in the collision hall (continued)

- [4] Remind the people performing the work of the following information:
  - [a] Exit the collision hall and depress the crash button on the way out if any unusual or dangerous situation develops.
  - [b] Stay out of confined areas with exposed bus. (Point these areas out.)
  - [c] Keep a safe distance from exposed bus. Valve handles and gauges can be electrically energized. (Point these areas out.)
  - [d] Large metal objects (e.g., ladders, pipes) cannot be carried when power is on.
  - [e] Always work with another person. Take brief work breaks at least every two hours to avoid fatigue.
  - [f] Tell the escort if you need a magnet de-energized.
  - [g] Fermilab Lockout/Tagout procedures must be followed if personnel must touch magnet coils or bus without satisfactory protective equipment.

#### 4.5 Securing from power-on access

- [1] Instruct the DØ Operator to set the power supplies to 0 amps and turn them off.
- [2] Verify that all people have exited the enclosure.
- [3] Remove the flashing lights and signs.
- [4] Leave the enclosure.
- [5] Return the Collision Hall supervised access keys to the DØ Operator.
- [6] Instruct the DØ Operator to account for all supervised access keys.
- [7] Tell the DØ Operator to lock out both magnet power supply front panel AC switches with DØ configuration locks.

**NOTE**      *Routine supervised access to the collision hall may proceed under control of the Shift Captain once the power supplies are locked off.*

- [8] Inform the Beams Division Safety Officer, or designee, that the test is complete and that the electrical permit jumper can be removed.
- [9] Once the jumper has been removed, verify that the "Accelerator Permit" is "Not Ok" on both the solenoid and toroid interlock status indicators.

- [10] Log in the DØ Electronic Log Book that the work is complete and the electrical interlocks are un-jumpered.
- [11] Insert the informational copy of this procedure that was used as the checklist into the DØ Electronic Log Book Backup Binder and make an appropriate note in the electronic logbook (hardcopy of procedure/checklist filed in Backup Binder).

## **5 REFERENCES**

- A. Beams Division Procedure BDSP-10-002, "Safety System Interlock Bypass Procedure"
- B. Beams Division Safety System Power Supply Jumper Request Form
- C. DØ Procedure - DØ-SAFETY-BLDG-001, "Search and Secure-Collision Hall"
- D. FESHM 5062.2, "Static Magnetic Fields"
- E. FESHM 5044, "Protection Against Exposed Electrical Bus"
- F. DØ Magnet Power-On Access Job Hazard Analysis
- G. TRAIN Database
- H. DØ Electronic Log Book
- I. DØ Electronic Log Book Backup Binder

## **6 APPENDICES**

None